



Red Hat OpenShift Data Foundation 4.10

Deploying OpenShift Data Foundation on single node OpenShift clusters

Instructions for deploying OpenShift Data Foundation on single node OpenShift clusters.

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Abstract

Read this document for instructions regarding installing Red Hat OpenShift Data Foundation Logical Volume Manager Operator on single node OpenShift clusters. Deploying OpenShift Data Foundation on single node OpenShift clusters is a Technology Preview feature. Technology Preview features are not supported with Red Hat production service level agreements (SLAs) and might not be functionally complete. Red Hat does not recommend using them in production. These features provide early access to upcoming product features, enabling customers to test functionality and provide feedback during the development process.

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MAKING OPEN SOURCE MORE INCLUSIVE

Red Hat is committed to replacing problematic language in our code, documentation, and web properties. We are beginning with these four terms: master, slave, blacklist, and whitelist. Because of the enormity of this endeavor, these changes will be implemented gradually over several upcoming releases. For more details, see [our CTO Chris Wright's message](#).

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 2. In the **Component** section, choose **documentation**.
 3. Fill in the **Description** field with your suggestion for improvement. Include a link to the relevant part(s) of documentation.
 4. Click **Submit Bug**.

PREFACE

Red Hat OpenShift Data Foundation supports deploying OpenShift Data Foundation using the OpenShift Data Foundation Logical Volume Manager Operator on single node OpenShift (SNO) clusters.

OpenShift Data Foundation Logical Volume Manager Operator provides dynamic provisioning of block storage on a single, limited resources SNO cluster.

You can deploy the OpenShift Data Foundation Logical Volume Manager Operator on a single node OpenShift baremetal cluster and configure it to dynamically provision storage for your workloads.

CHAPTER 1. PREPARING TO DEPLOY OPENSIFT DATA FOUNDATION ON SINGLE NODE OPENSIFT CLUSTERS

Before you begin deploying OpenShift Data Foundation Logical Volume Manager Operator on single node Openshift clusters, ensure that the following requirements are met:

1. You have installed Red Hat Advanced Cluster Management for Kubernetes (RHACM) on an OpenShift cluster. For information, see [Red Hat Advanced Cluster Management for Kubernetes: Install](#).
2. Every managed SNO cluster has dedicated disks that are used to provision storage.

CHAPTER 2. INSTALLING THE OPENSIFT DATA FOUNDATION LOGICAL VOLUME MANAGER OPERATOR USING RHACM

The OpenShift Data Foundation Logical Volume Manager Operator is deployed on single node OpenShift (SNO) clusters using Red Hat Advanced Cluster Management for Kubernetes (RHACM). You create a Policy on RHACM that deploys and configures the operator when it is applied to managed clusters which match the selector specified in the **PlacementRule**. The policy is also applied to clusters that are imported later and satisfy the **PlacementRule**.

Prerequisites

- Access to the RHACM cluster using an account with **cluster-admin** and operator installation permissions.
- Dedicated disks on each SNO cluster to be used by OpenShift Data Foundation Logical Volume Manager Operator.

Procedure

1. Log in to the RHACM CLI using your OpenShift credentials.
For more information, see [Install Red Hat Advanced Cluster Management for Kubernetes](#) .

2. Create a namespace.

```
# oc create ns lvm-policy-ns
```

3. Create the policy YAML in the namespace.

```
# This policy verifies the installation of the official version of the OpenShift Data Foundation
# Logical Volume Manager Operator on the managed clusters.
# If set to "enforce" it installs the operator.
# Used APIs: OLM, ODF-LVMO #https://github.com/operator-framework/operator-lifecycle-
manager
# https://github.com/red-hat-storage/lvm-operator

apiVersion: policy.open-cluster-management.io/v1
kind: Policy
metadata:
  annotations:
    policy.open-cluster-management.io/categories: CM Configuration Management
    policy.open-cluster-management.io/controls: CM-2 Baseline Configuration
    policy.open-cluster-management.io/standards: NIST SP 800-53
  name: policy-lvm-operator
spec:
  disabled: false
  policy-templates:
  - objectDefinition:
      apiVersion: policy.open-cluster-management.io/v1
      kind: ConfigurationPolicy
      metadata:
        name: policy-lvm-namespace
      spec:
        object-templates:
```

- complianceType: musthave
 - objectDefinition:
 - apiVersion: v1
 - kind: Namespace
 - metadata:
 - name: openshift-storage
 - labels:
 - openshift.io/cluster-monitoring: "true"
 - remediationAction: inform
 - severity: high
 - objectDefinition:
 - apiVersion: policy.open-cluster-management.io/v1
 - kind: ConfigurationPolicy
 - metadata:
 - name: policy-lvm-operator-operatorgroup
 - spec:
 - object-templates:
 - complianceType: musthave
 - objectDefinition:
 - apiVersion: operators.coreos.com/v1alpha2
 - kind: OperatorGroup
 - metadata:
 - name: openshift-storage-operatorgroup
 - namespace: openshift-storage
 - spec:
 - targetNamespaces:
 - openshift-storage
 - remediationAction: inform
 - severity: high
- objectDefinition:
 - apiVersion: policy.open-cluster-management.io/v1
 - kind: ConfigurationPolicy
 - metadata:
 - name: policy-lvm-operator-subscription
 - spec:
 - object-templates:
 - complianceType: musthave
 - objectDefinition:
 - apiVersion: operators.coreos.com/v1alpha1
 - kind: Subscription
 - metadata:
 - name: odf-lvm-operator
 - namespace: openshift-storage
 - spec:
 - channel: stable-4.10
 - installPlanApproval: Automatic
 - name: odf-lvm-operator
 - source: redhat-operators
 - sourceNamespace: openshift-marketplace
 - startingCSV: odf-lvm-operator.v4.10.0
 - remediationAction: inform
 - severity: high
- objectDefinition:
 - apiVersion: policy.open-cluster-management.io/v1
 - kind: ConfigurationPolicy
 - metadata:

```

    name: policy-lvmcluster
  spec:
    object-templates:
      - complianceType: musthave
        objectDefinition:
          apiVersion: lvm.topolvm.io/v1alpha1
          kind: LVMCluster
          metadata:
            name: lvmcluster-sample
            namespace: openshift-storage
          spec:
            storage:
              deviceClasses:
                - name: vg1
        remediationAction: enforce
  ---
apiVersion: policy.open-cluster-management.io/v1
kind: PlacementBinding
metadata:
  name: binding-policy-lvm-operator
placementRef:
  apiGroup: apps.open-cluster-management.io
  kind: PlacementRule
  name: placement-policy-lvm-operator
subjects:
  - apiGroup: policy.open-cluster-management.io
    kind: Policy
    name: policy-lvm-operator
  ---
apiVersion: apps.open-cluster-management.io/v1
kind: PlacementRule
metadata:
  name: placement-policy-lvm-operator
spec:
  clusterConditions:
    - status: 'True'
      type: ManagedClusterConditionAvailable
  clusterSelector:
    matchExpressions:
      - key: env
        operator: In
        values:
          - dev

```

4. Run the following command:

```
# oc create -f policy-lvm-operator.yaml -n lvm-policy-ns
```

This creates a **Policy**, a **PlacementRule**, and a **PlacementBinding**. The **Policy** creates a **Namespace**, **OperatorGroup**, **Subscription**, and **LVMCluster** resource. This deploys the operator on the SNO clusters which match the selection criteria and configures it to set up the required resources in order to provision storage. The operator uses all the unused disks after installation.

CHAPTER 3. MONITORING THE OPENSIFT DATA FOUNDATION LOGICAL VOLUME MANAGER OPERATOR

You can monitor the OpenShift Data Foundation Logical Volume Manager Operator by viewing the metrics exported by the operator on the RHACM dashboards. Enable RHACM Observability as described in the [Observability](#) guide.

- Add the following `topolvm` metrics to the allow list as specified in the [Adding custom metrics](#) section:

```
topolvm_volumegroup_size_bytes  
topolvm_volumegroup_available_bytes
```

CHAPTER 4. UNINSTALLING OPENSIFT DATA FOUNDATION LOGICAL VOLUME MANAGER OPERATOR

To uninstall OpenShift Data Foundation Logical Volume Manager Operator, you can either delete the policy or change the matching so that the policy does not match to that cluster any more.

Prerequisites

- Ensure that the persistent volume claims (PVCs) and persistent volumes (PVs) provisioned using the the OpenShift Data Foundation Logical Volume Manager Operator is deleted before deleting the policy.
- Ensure that the following are deleted:
 - All the applications on the managed clusters using the storage provisioned by the Logical Volume Manager Operator.
 - Persistent volume claims (PVCs) and persistent volumes (PVs) provisioned using the Logical Volume Manager Operator.

Procedure

- Delete the policy on the hub cluster by using the following command:

```
# oc delete -f <policy-name> -n <policy-ns>
```

The OpenShift Data Foundation Logical Volume Manager Operator does not currently clean up the LVM resources created on the node on uninstallation. You must manually remove the resources on the node after uninstalling the operator. For more information, see <https://access.redhat.com/solutions/6843041>.